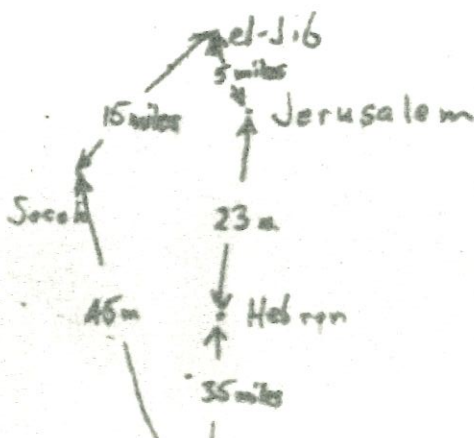


PRESERVATION COPY: 10/07/2014

Problem for Emission Spectrograph - Pottery Analyses

Problem - I can give more information if they want it
JBP, Hitchard

During the 1960s and the 1970s, the University Museum's excavation at el-Jib in the West Bank of Jerusalem found 31 pottery jars in the area. The jars were found in eleven of the 13 pits. The jars were placed in the pits in the following order: Hebron; a jar with the place name el-Jib (which is present, but possibly a derivation from the name of the place); and 7 jars with the name of the place. The jars are not located in the pits in the following order: place name on a jar handle: (1) the name of the place where the jar was made, or (2) the name of the administrative district from which the jar was made, or to the place. It is possible that the jars are a group of handles (Hebron, for example) is a group that it is different from that of another group (el-Jib or Socoh), then it would be certain that the name on the jar is the place of manufacture. The experiment was based upon the assumption that the clay used in the manufacture of pottery in the four places was of a slightly different composition and that the differences can be detected.



Techniques

Dr. Rainey

I think that the newly written piece on matrix ordering for the Computers in Archaeology Section of Newsletter is now much more readable.

Anne Green had sent off the Dixon blurb to you as soon as we received it. I hadn't expected to publish it as such.

Hope you think this copy is clearer. I see Miss Bruckner Thurs. aft. (the 8th) and hope to get the Newsletter to the printers that week.

Jeannette Franck

Matrix Ordering by Computer

If complex matrix ordering techniques are to be of practical value in archaeology, they must be programmed for use on digital computers. Drs. R.S. Kuzara, G.R. Mead, and K.S. Dixon, California State College at Long Beach, have developed such a program for the seriation of anthropological data using ^{such} matrix ordering approaches as the Brainerd-Robinson technique, although not limited to this technique alone. This new program has some specific advantages over the first computer program for the Brainerd-Robinson technique published by Marcia and Robert Ascher in 1963. These include working with the whole matrix pattern from start to finish rather than one row and column at a time, and more exhaustive row-column comparisons rather than the immediate and permanent placement of each row and column as soon as it satisfies the criteria. In addition the program has provisions for specifying different ordering criteria and/or allowing consistent use of a chosen criterion for evaluating different matrix configurations, neither of which is possible with the Ascher program. These help to determine the appropriate criterion for achieving the best ordering for different kinds of data. The new program also attacks the problem of built-in input order bias. The authors feel that the improvements presented in this computer program have advantages for obtaining the best ordering inherent in the data and allow for experimentation with ordering criteria and the matrix order as a whole. A full discussion of this new program will appear in a paper by Kuzara, Mead, and Dixon in the December issue of the American Anthropologist.

DR. Palmer

GRID PROCEDURE

In most cases, after preliminary exploration along lines with the audio readout, grids are laid out in the areas of interest, to be covered in detail with the precision readout. For each grid, two parallel lines (one at each end of the grid) are marked with stakes at 10-meter intervals with tape measures. A rope, calibrated in 2-meter intervals, is then strung between the end stakes of each line. The man carrying the sensor then walks along this line (the zero line) and the adjacent two- and four-meter lines and pauses at each two-meter marker for a reading to be taken. Upon the completion of the first three readings, he then moves 2 meters into the grid, three more readings are taken, and so on in a serpentine fashion along the edge of the grid. After the completion of three lines, the rope is moved between the and strung/ next 10 meter stakes, and the sensor man then moves to the six-, eight-, ten-, twelve-, and fourteen-meter stations at each two-meter marker on the rope, and traverses the grid again, but with a serpentine pattern now five measurements wide.

Each reading is called out by the man carrying the readout and batteries, and is recorded by a third person in a notebook oriented in the same direction as the grid being traversed. In bushy or rough terrain, a fourth person coils and uncoils the 100-meter cable leading to the fixed sensor. When the grid is finished, the pages of the notebook are then put together with

Scotch "magic-mending" tape to form the complete grid.

The differential mode with 2 sensors is usually used for all grids with the second sensor placed in a fixed position in the middle of each grid. The usual height of the movable sensor is in the comfortable position at arm's length at one's side - about 75 cm above the ground. Grids may be varied in size, but it is frequently convenient to lay them out in 100 x 100 meter squares. This area can be covered at 2-meter intervals in a six to eight hour work day, depending upon the terrain.

After a grid has been taped together, contour lines of equal magnetic intensity are then drawn for easy visualization of magnetic patterns. In these plots, "0" represents 80,000 units; "10" = 80,010 units; "990" = 79,990 units, etc. In most grids, with average anomalies, contours are drawn at intervals of 10 units, or approximately 5 γ .

When several grids are made, one adjacent to another, the average base readings may be adjusted to be the same for each by placing an artificial anomaly such as a compass near the fixed sensor. Thus, a reading such as "40 units" in the second or subsequent grids represents the same difference in magnetism above background without anomalies (usually set at 20 units for convenience) as in the first grid. This aids in the interpretation of the final plots of magnetic contours by allowing adjacent grid maps to be connected directly together with no discontinuity.

DATES	Resistivity Instruments, Geohms made by Gossen Co., Germany			Proton Magnetometer "Elsec" made by Littlemore Scientific Co., Oxford, England	Gradiometer made by MacLaughlin Electronics, Parkersville Pa.	Metal Detector made by Fisher Res. M-Scope & M-10	Sonic Device	
	Unit #1	Unit #2 (Also Seismic Instrument made by Geophysical Specialties Co. Minnesota)	Unit #3				Prototype made by MacLaughlin Electronics Parkersville, Pa. or new unit	Research
FALL 1962		Harpers Ferry			Local tests Harpers Ferry Phila. Elec. Co. - flanges in H ₂ O pipes	Local tests Harpers Ferry	?	Texas Inst. MacLaughlin Petty Co.
WINTER 1962-63					SE U.S.	SE U.S.		//
SPRING 1963			Sybaris					Sybaris
SUMMER 1963		Harpers Ferry	N. Ireland			Isle Royal, Lake Superior		N. Ireland

DATES	Resistivity Instruments, Geohms made by Gossen Co., Germany			Proton Magnetometer "Elsac" made by Littlemore Scientific Co., Oxford, England	Gradiometer made by MacLaughlin Electronics, Perkiomenville Pa.	Metal Detector made by G.S. Co., Calif.	Sonic Device	
	Unit #1	Unit #2 (Also Seismic Instrument made by Geophysical Specialties Co. Minnesota)	Unit #3				Prototype made by MacLaughlin Electronics Perkiomenville, Pa.	Research
Winter	Patterson, L.I.							
Mid-May → June - 1 → Aug. or Sept. end Aug. Oct. - Dec.	Phillips, Firenze	Waites, England Barrow P.A.?	Ralph, etc. Canada					
Dec. →								

→

Ralph!

Flaury - Ariz.

revised
4/70

SECTION II
OPERATING INSTRUCTIONS
(For Meter Output)

DESCRIPTION OF CONTROLS (See Figure V-1)

1. Phone Jack: This receptacle serves as both an on/off switch and the earphone connection. The instrument will remain on only while the earphones are connected.

2. Coax Connector: (Located adjacent the phone jack.) This connector provides access to the phase detector output. A meter with dual sensitivity (25 γ and 100 γ full scale) is provided and can be used to measure the phase detector output.

OPERATIONAL CHECKS

The following tests are to be performed in a low* or zero field gradient area (in an open field at least 100 feet from any buildings or power lines). All magnetic material associated with the operator (e.g., keys, belt buckles, tie clasps, etc.) should be removed before proceeding.

Keep the instrument at least three (3) feet from the ground.

1. Align the sensor from east to west. If there is a compass available, align the sensor perpendicular to the compass needle.

2. With the sensor aligned east to west, rotate the sensor along its cylindrical axis until the phone jack is facing downward. Note the meter reading. Rotate the

*Low gradient is defined as an area in which the magnetic field varies spacially less than two gammas in eight inches.

sensor 180 degrees (sensor connector up). If the meter reading is different after the 180° rotation, adjust potentiometer X (See Figure II-1) for a meter reading half way between the two readings.

3. Repeat step 2 with the connector initially facing north and rotating until the phone jack is facing south. Adjust potentiometer Y (see Figure II-1) for a meter reading half way between the two readings.⁽¹⁾

4. Upon completion of step 3, align the cylindrical axis of the sensor in the vertical direction. Take note of the meter reading.

5. Reverse the sensor and note the meter reading. If the reading is different from that in step 4, adjust potentiometer BAL for a meter reading half way between the up and down readings. Repeat steps 4 and 5 until the meter readings for both up and down are the same. (Minimum difference in meter reading.)

6. Adjust potentiometer ZERO for a zero meter reading while the sensor is in the vertical position.

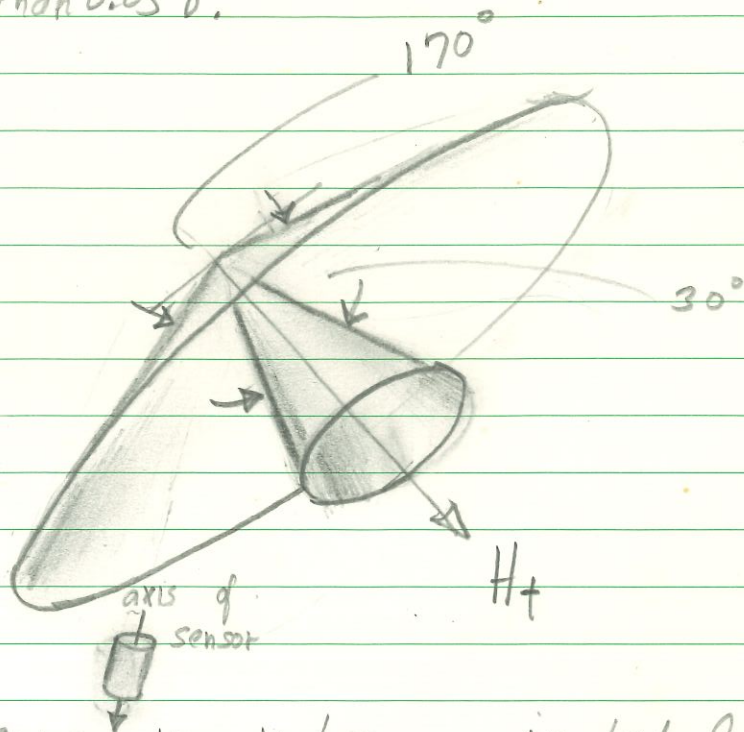
7. Repeat steps 1 through 5 until the meter reading varies no more than 10 gammas for any orientation of the sensor.

The instrument is now ready for operation.

1. Steps 2 and 3 are to be repeated until there is a minimum of change in tone for a 360-degree rotation of the sensor.

Rubidium Magnetometer operating zone

Deviations $\pm 10^\circ$ or 15° about a line 45° from H_t are less than 0.05%.



Operating zone is volume included between cones whose apex angles are 30° and 170°

[Nov. 20, 1965?]

CAPTION

Plot of Specific Thermoluminescence versus Known Age for samples from Solduz Valley, Iran, (nos. 1 to 5) and Plain of Sybaris, Italy, (nos. 6, 7, 12, and 13). The postscripts A, B, etc. represent different sherds of the same age for each number. (Preliminary results from E. K. Ralph and M. C. Han, Applied Science Center for Archaeology, University Museum, University of Pennsylvania)